

at Brackettsville. Texas, 27° at San Antonio to 43° at Jacksboro' and Ft. Elliott. Rocky Mountains, 25° on summit of Pike's Peak to 36° at Chyenne, and 39° at Santa Fe. Western Plateau, 29° at Pioche to 37° at Boise City and 50° at Winnemucca. California, 21° at San Francisco, to 38° at Red Bluff and 40° at Visalia.

Frost has been reported very frequently from all sections north of the 35th parallel, but the extreme southern limit is described by a line passing along the southern boarder of Arizona and New Mexico reaching eastward to Concho, Tex., thence deflecting southward to the Rio Grand valley near Brackettsville. From this point it passes eastward to San Antonio and thence directly northward to the southern boundary of Indian Territory. Again deflecting eastward it passes through Vicksburg and between Mobile and Montgomery, reaching the western coast of Florida south of Cedar Keys and the Atlantic coast at Savannah.

Frost, injurious to vegetation, was reported in the various States on the following dates: *Vermont*: 29th. *Massachusetts*: 26th, 28th and 29th. *New York*: 20th and 21st. *New Jersey*: 1st, 14th and 19th. *North Carolina*: 18th, 19th, 24th and 25th. *Tennessee*: 18th. *Ohio*: 18th and 25th. *Michigan*: 28th. *Indiana*: 18th. *Wisconsin*: 13th. *Missouri*: 17th and 18th. *Indian Territory*: 4th. *Kansas*: 17th. *Wyoming Territory*: 10th.

Ground Frozen.—*Oswego*, N. Y., 28th. *Buffalo*, N. Y., 28th. *Bangor*, Me., 25th. *Southington*, Conn., 19th. *Genoa*, Neb., 16th. *Grafton*, N. H., 29th. *Freehold*, N. J., 19th. *Palermo*, N. Y., 28th. *Elsworth*, N. C., 25th. *Cleveland*, O., 18th. *College Hill*, O., 18th. *Wooster*, O., 19th. *Bloomington Grove*, Pa., 22nd. *Charlotte*, Vt., 25th and 29th. *Lanenburg* Vt., 29th. *Neillsville*, Wis., 27th and 31st.

Ice formed in the various States on the following dates:—*Maine*: 14th, 15th, 18th and 25th. *New Hampshire*: 1st, 14th, 25th and 29th. *Massachusetts*: 8th, 9th, 14th and 25th. *Rhode Island and Connecticut*: 25th. *New York*: 1st, 14th, 18th to 21st, 24th to 28th. *New Jersey*: 13th, 17th to 20th, 24th and 25th. *Maryland*: 19th and 25th. *Virginia*: 18th, 19th, 24th and 25th. *West Virginia and Pennsylvania*: 19th. *North Carolina*: 18th, 25th and 26th. *Tennessee*: 23rd. *Ohio*: 7th, 8th, 18th, 19th and 25th. *Indiana*: 18th. *Michigan*: 19th, 24th and 29th. *Illinois*: 17th, 18th, 23rd and 24th. *Missouri*: 4th, 17th, 18th, 19th to 23rd. *Indian Territory*: 17th. *Kansas*: 4th, 5th, 16th to 19th. *Nebraska*: 3rd, 4th, 16th to 19th, 22nd to 24th, 28th to 31st. *Iowa*: 5th, 17th, 18th, 22nd, 23rd, 24th, 28th to 31st. *Wisconsin*: 17th, 18th, 27th, 31st. *Minnesota*: 16th and 17th. *Dakota*: 3rd, 12th and 18th. *Utah*: 10th. *Idaho*: 9th, 10th, 11th, 12th, 15th and 29th. *Washington Territory*: 10th, 11th, 15th and 16th.

PRECIPITATION.

The general distribution of rain-fall, for October, 1880, is shown on chart No. III, as accurately as possible, from about 500 reports. The table on this chart shows the *average* precipitation for October, as compared with that of the present month. East of the Mississippi river, except in the Upper Mississippi valley, Upper Lake region and Middle Atlantic States, where there were slight deficiencies, there were excesses of rain-fall, ranging from 3.36 inches in the Florida peninsula and 2.40 inches in the South Atlantic States to 0.17 in New England. West of the Mississippi, except in Minnesota and the Lower Missouri valley, where slight excesses occurred, the rain-fall was below the average, the greatest deficiency 1.47 inch, occurring in the North Pacific coast region.

Special Heavy Rains.—2nd, Leavenworth, Kan., 2.56 inches in 11 hours 25 minutes; Sterling, Ill., 2.25 in. in 9 hours 30 minutes; Jacksboro, Tex., 4.12 in. 3rd, Jacksonville, 2.25 in. 3rd and 4th, Pt. Pleasant, La., 3.01 in.; Kansas City, Mo., 2.00 in. 3rd to 11th, Mayport, Fla., 15.83 in. 4th, Vicksburg, 2.71 in.; Savannah, 2.24 in. in 7 hours 5 minutes. 7th and 8th, Jacksonville, 4.28 in. in 24 hours; Charleston, 4.50 in. 8th and 9th, Cedar Keys, 4.51 in. 9th, Cape Lookout, N. C., 3.82 in. 9th and 10th, Jacksonville, 4.03 in 20 hours 15 minutes; St. Augustine, Fla., 10.31 in. 13th, near Howard, Neb., 1.38 in. in 50 minutes; Lexington, Mo., 4.32 in. 15th and 16th, Louisville, Ky., 3.23 in.; Louisville, Ill., 2.00 in. in 15 hours; Laconia, Ind., 4.70 in.; Paducah, Ky., 2.37 in. 16th, Toledo, 1.15 in. in 3 hours; Fort Barrancas, Florida, 3.07 in.; Paducah, Ky., 2.92 in. 21st and 22nd, Cedar Keys, Florida, 3.19 in. 25th, Springfield, Illinois, 0.23 in. in 6 minutes. 26th, Fredericksburg, Texas, 2.00 in. 27th, Ft. Barrancas, Florida, 3.62 in.; Helena, Ark., 2.15 in. 27th to 30th, Pt. Pleasant, La., 8.00 in. 28th, Vicksburg, 2.00 in.; Mobile, 2.84 in. 28th and 29th, Wilmington, 2.69 in. in 16 hours; Elsworth, N. C., 6.30 in. 29th, Smithville, 2.51 in. in 10 hours 10 minutes. 29th and 30th, Nashville, 2.30 in. in 25 hours 23 minutes. 30th and 31st, Springfield, Mass., 2.02 in.; Grafton, N. H., 2.45 in., 1.80 in. in 12 hours; Portland, Me., 2.69 in. in 23 hours 45 minutes; Springfield, Mass., 2.24 in. in 20 hours 5 minutes; Burlington, Vt., 2.20 in.; Antrim, N. H., 2.70 in.; Dundee, N. Y., 2.77 in.; Bristol, N. H., 3.04 in.; Lake Village, N. H., 2.97 in.

Largest Monthly Rain-falls.—Mayport, Fla., 20.03 inches; Jacksonville, 16.25; St. Augustine and Paducah, Ky., 14.29; Cape Hatteras, 12.00; Cedar Keys, 10.37; Ft. Barrancas, Fla., 9.78; Charleston, 9.19; Elsworth, N. C., 8.50; Punta Rassa, 8.10; Mt. Washington, 7.96; Cape Lookout, 7.90; Mobile, 7.32; Nashville, 7.24; Laconia, Ind., 7.20; Cairo, 6.96; Smithville, 6.62; Savannah, 6.58; Louisville, 6.39; Evansville, Ind., 6.37; Kittyhawk, 5.95.

Smallest Monthly Rain-falls.—Sacramento and Winnemucca, none; Princeton, Cal., trace; Pleasanton, Cal., 0.01; Point San Jose, 0.03 inch; Browns, Nev., and Ravenna, Cal., 0.02; San Francisco, 0.05; Red Bluff, 0.08; Borden, Cal., 0.11; Los Angeles and Visalia, Cal., and Florence and Tucson, Ariz., 0.13; Ft. Bennet, Dak., and Terrace, Nev., 0.15; Phoenix, Ariz., 0.20; Ft. Assiniboine, Mont., and Keene, Cal., 0.22; Santa Monica, Cal., 0.23; Ft. Shaw, Mont., and Muscatine, Iowa, 0.25; Brackettsville, Tex., and Bismarck, 0.27; Anaheim, Cal., 0.28; Umatilla, Or. and La Mesilla, N. M., 0.35; Ft. Stevenson, Dak., 0.36; Ft. Davis, Tex., 0.38; Salt Lake City, 0.40; Uvalde, Tex., 0.44; Fort Grant, Ariz., and El Paso, Tex., 0.47; Boise City, 0.50; Milwaukee, 0.51; Ft. Sill, 0.54; Ft. Verde, Ariz., 0.57.

Rainy Days.—The number of days on which rain or snow has fallen, varies as follows: New England, 7 to 16; Middle Atlantic States, 5 to 13; South Atlantic States, 7 to 17; Eastern Gulf States, 10 to 14; Western Gulf States, 4 to 10; Ohio valley and Tennessee, 10 to 16; Lower Lake region, 14 to 22; Upper Lake region, 7 to 20; Upper Mississippi valley, 5 to 10; Lower Missouri valley, 5 to 7; Valley of the Red River of the North, 9 to 11; Rio Grande valley, 3 to 8; Texas, 3 to 7; Rocky Mountains, 5 to 17; Western Plateau, 0 to 5; California, 0 to 3; Oregon, 3 to 10; Washington Territory, 7 to 9.

Cloudy Days.—The number varies in New England from 5 to 14; Middle Atlantic States, 6 to 10; South Atlantic States, 8 to 16; Eastern Gulf States, 6 to 16; Western Gulf States, 3 to 10; Ohio valley and Tennessee, 8 to 13; Lower Lake region, 10 to 13; Upper Lake region, 8 to 16; Upper Mississippi valley, 7 to 12; Lower Missouri valley, 5 to 11; Valley of the Red River of the North, 12 to 14; Rio Grande valley, 4 to 7; Texas, 1 to 9; Rocky Mountains, 4 to 9; Western Plateau, 2 to 5; California, 1 to 3.

Hail.—*New York:* Madison Barracks, 6th; Buffalo, 17th, 18th. *Pennsylvania:* Catawissa, Fallsington, Philadelphia and West Chester, 28th; Green Castle, 26th. *New Jersey:* Freehold and Princeton, 28th. *Illinois:* Chicago, 1st, 2nd, 25th; Morrison and Sterling, 2nd. *Iowa:* Dubuque, 14th, 16th; Clinton, 3rd; Cresco, 15th; Mt. Vernon, 2nd. Des Moines, 15th, severest storm experienced since opening station; great damage to windows; stones varied in size from hickory nuts to walnuts; width of track one-quarter mile; direction from southwest to northeast. *Kansas:* Holton, 2nd. *Michigan:* Lansing, 2nd, 25th; Marquette, 16th. *Minnesota:* St. Vincent, 10th; New Ulm, 15th; Duluth, 28th. *Wisconsin:* Milwaukee, 25th. *Dakota:* Ft. Bennet, 15th, 16th. *Texas:* San Antonio, 27th; Pilot Point, 15th. *New Mexico:* Santa Fe, 12th. *Oregon:* Albany, 10th. *Washington Territory:* Pomeroy, 14th.

Snow.—*New Hampshire:* 19th, 24th, 26th; on summit of Mt. Washington, 1st, 2nd, 5th, 6th, 7th, 8th, 12th, 13th, 18th to 23rd, 25th to 31st. *Vermont:* 19th, 20th, 23rd, 25th, 28th. *Massachusetts:* 19th, 20th, 24th. *New York:* 17th, 18th, 19th, 20th, 23rd, 24th, 27th, 28th. *New Jersey:* 19th, 28th. *Pennsylvania:* 19th, 24th, 28th. *Maryland:* 19th, 22nd and 23rd in mountains. *West Virginia:* 19th, 23rd. *Kentucky:* 19th. *Ohio:* 17th, 19th, 20th, 23rd, 24th. *Michigan:* 16th to 24th, 26th, 27th. *Indiana:* 15th, 17th to 19th. *Illinois:* 16th, 17th, 19th to 23rd. *Missouri:* 16th. *Wisconsin:* 16th, 17th to 19th, 23rd. *Iowa:* 15th to 19th, 23rd. *Kansas:* 15th, 16th. *Nebraska:* 14th to 18th, 21st. *Minnesota:* 15th to 21st, 23rd, 30th. *Dakota:* 9th, 15th to 18th, 26th. *Colorado:* 9th to 13th, 15th, 26th, 30th. On summit of Pike's Peak, 9th, 11th, 12th, 13th, 18th to 24th, 31st. *New Mexico:* 10th, 11th. *Nevada:* 8th, 10th, 11th, 12th. *Utah:* 8th, 9th, 10th, 14th. *Wyoming:* 9th, 10th, 14th to 18th, 29th. *Idaho:* 14th. *Montana:* 8th, 9th, 14th, 15th, 28th.

Droughts.—Ft. Madison, Iowa, 30th, water very scarce; pastures drying up. Yates Centre, Kan., 31st, streams and ponds lower than for past six years. Emmitsburg, Md., 30th, month very dry. Sandy Springs, Md., 31st, great scarcity of water; streams unusually low. Contoocookville, N. H., 1st to 30th, quite severe. Palermo, N. Y., 18th, very dry; wells and streams low. Greencastle, Pa., last half of month streams very low; wells and springs nearly dry; boats on Delaware and Hudson Canal stopped running for want of water. Woodstock, Vt., throughout month, springs and wells remarkably low. Wytheville, Va., 29th, drought has been very severe since the 1st; cisterns and wells generally exhausted and streams very low.

Snow from a Cloudless Sky.—Springfield, Ill., 18th.

Snow on Ground at End of Month.—Virginia City, Mont., 1.50 inches; Pike's Peak, 2 ft. 2 in.; Breckenridge, Minn., trace; Mt. Washington, 4.00 in.

Rain-falls During September, Received Too Late to Be Used in September Review.—*Arizona:* Whipple Barracks, 0.40; Ft. Lowell, 0.38; Ft. Bowie, 1.35; Ft. Verde, 0.52; Ft. McDowell, 0.34; Ft. Apache, 0.30; Ft. Mojave, 0.07; Prescott, 1.26; Phoenix, 0.67; Florence, 0.55; Fort Thomas, 0.54; Ft. Grant, 1.01. *California:* Benecia Barracks, Point San Jose, Angel Island, Alcatraz and Presidio, none; Ft. Gaston, 0.04; Ft. Bidwell, 0.05; Campo, 0.01. *Colorado:* Ft. Lyon, 0.95; *Dakota:* Ft. Sisseton, 0.60. *Idaho:* Ft. Lapwai, 0.82; Lewiston, 0.20. *Montana:* Ft. Benton, 0.48; Ft. Ellis, 0.28; Ft. Logan, 0.60. *Oregon:* Ft. Stevens, 2.04; Klamath, 0.00. *Washington Territory:* Ft. Canby, 1.80; Ft. Townsend, 0.90; Dayton, 0.19. *Wyoming Territory:* Ft. Fetterman, 0.60.